



FreeZone® Plus™ 6 & 12 Liter Cascade Freeze Dry Systems

FEATURES & BENEFITS

Optional built-in mini vacuum drying chamber holds small samples, either in bulk or in small containers such as serum bottles. It is used in conjunction with other drying accessories mounted on the attachment port. A separate drying accessory is required (sold separately). Its 50-watt heater is microprocessor-controlled from the front panel to +60° C (+140° F). (The chamber is not cooled. The only cooling is from the frozen sample.)

Easy-to-follow operating instructions are printed on the left-hand side.

Automatic start-up is quick and easy to use. Pressing one button initiates the collector cool-down and vacuum pull-down sequence. Or, manually override this feature at any time using the separate switches for manual refrigeration and vacuum.

Collector drain hose is accessible from the front for convenient defrost. It extends about 9 inches and retracts within the cabinet when not in use.

Factory wired. All models require a 3-wire cord with 20 amp NEMA plug.



CE marking. All 230 volt, 50 Hz models conform to the CE (European Community) directives.



ETL listed. Models for operation on 115 volts, 60 Hz or 230 volts, 60 Hz carry the ETL mark signifying they are certified to UL and CAN/CSA standards for laboratory equipment.

✳ **LCD** displays system set-up and operating parameters and alarm messages.

Attachment port makes connection of accessories easy. Select from accessory drying chambers and manifolds (sold separately).

Upright, stainless steel collector chamber speeds and simplifies defrost. Models are available with PTFE-coated collector coil and chamber for additional corrosion resistance.

Vacuum and temperature graphs display relative system vacuum and collector temperature. Amber LED “waves” illuminate when vacuum and temperature levels are out of range for adding samples. Green LED lights indicate that conditions are right to add samples.

✳ **Red alarm light** flashes and beeper sounds to indicate that an abnormal system event has occurred. Pressing the Menu Switch displays the alarm message on the LCD.

✳ **Moisture sensor** protects the vacuum pump by preventing refrigeration or vacuum start-up when moisture is detected in the collector chamber area.

Vacuum control valve maintains setpoint vacuum level to speed the freeze drying process.

HCFC/CFC-free refrigeration systems ensure rapid, environmentally-safe cooling. Two refrigeration systems, used in series, cool the stainless steel collector to **-84° C (-119° F)** making this system ideal for freeze drying samples with low eutectic points including acetonitrile. The systems use a non-flammable refrigerant that contains no ozone-damaging hydrochlorofluorocarbon (HCFCs) or chlorofluorocarbons (CFCs).

Rear-mounted RS-232 port may be used to transmit data to a user-supplied computer. The time between data transmissions may be set to occur at 10, 30, 60, 300 or 600 second intervals.

Rear-mounted electrical receptacle allows connection of the vacuum pump (sold separately).

Optional purge valve isolates the vacuum pump from the freeze dry system. The pump starts and warms the oil, while the collector cools, before pulling vacuum on the system. Pump life may be extended by purging small amounts of contaminants from the vacuum pump oil. Green indicator lights when the purge valve is closed.

✳ **Durable console cabinet.** Cabinet, mounted on 3" diameter casters, is powder-coated steel with a removable brushed stainless steel front panel. The roomy interior accommodates a vacuum pump (sold separately).

Hot gas defrost. Hot gas from the compressor is circulated through the collector coil and automatically shuts off when the refrigerant reaches +65° C (+149° F).

✳ **Vacuum break valve** protects the system from oil backstreaming by bleeding air into the system when power to the freeze dryer or vacuum pump is shut off. If a brief power outage occurs (approximately 5 minutes), the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is long (approximately 5 minutes) and the collector warms above safe limits, the freeze dryer will not automatically restart, which prevents melted samples from being drawn into the collector and liquid from harming the vacuum pump.

Stainless steel baffle maximizes ice loading capabilities by evenly distributing collected ice over the entire collector coil.

✳ Exclusive feature



FreeZone® Plus™ 6 Liter Cascade Freeze Dry Systems

SPECIFICATIONS

All models feature:

- Upright stainless steel collector coil and chamber with stainless steel baffle capable of removing 4 liters of water in 24 hours and holding 6 liters of ice before defrosting.*
- Two 1/3 hp HCFC/CFC-free refrigeration systems, used in series, to cool collector to **-84° C (-119° F)**. For samples containing water or acetonitrile. Not for use with samples containing methanol or ethanol.
- Clear acrylic chamber lid, 3/4" thick, with neoprene gasket.
- ❖ Brushed stainless steel and glacier white, powder-coated steel exterior with blue accents.
- ❖ LCD that displays system operating parameters, set-up parameters and alarm messages. It may be user-configured to display vacuum in mBar, Pa or Torr and temperature in ° F or ° C. It also displays total number of hours of refrigeration system operation and time since the refrigeration was serviced and the total number of hours of vacuum pump operation and time since the vacuum pump was serviced (in hours).
- Red alarm light that flashes and beeper that sounds to indicate that an abnormal system event has occurred, including: power failure, improper line voltage supply, collector temperature rise above -40° C, service vacuum pump (after 1000 hours of vacuum use), and moisture in collector. Pressing the Menu Switch displays the alarm message on the LCD.
- LED vacuum and temperature "waves" for at-a-glance display of relative system vacuum and collector temperature.
- ❖ Moisture sensor that prevents refrigeration or vacuum start-up when moisture is detected in the collector chamber area.
- Vacuum control valve that maintains setpoint vacuum level.
- ❖ Vacuum break valve that bleeds air into the system when power to the freeze dryer or vacuum pump is shut off. If a power outage less than approximately 5 minutes occurs, the freeze dryer will restart and the refrigeration and vacuum system will resume operation once power is restored. If the power failure is more than approximately 5 minutes and the collector warms above safe limits, the freeze dryer will not automatically restart.
- Rear-mounted RS-232 port to transmit data to a user-supplied computer. Transmission intervals may be user-configured for 10, 30, 60, 300 or 600 seconds.
- Automatic start-up switch for collector cool-down and vacuum pull-down with manual override switches.
- Hot gas defrost and switch.
- Front-mounted, retractable, 9" collector drain hose.
- 3" diameter stainless steel port for connection of drying accessories (sold separately).
- Side-mounted power switch, rear-mounted electrical receptacle (for vacuum pump connection) and 3-wire cord with plug.
- 3" diameter casters.
- 3/4" OD vacuum connection, three feet of 3/4" ID vacuum hose and two clamps.
- Overall dimensions: 32.2" w x 28.0" d x 36.3" h (84.8 cm x 71.1 cm x 92.1 cm).
- Usable interior space: 14.0" w x 24.5" d x 22.0" h (35.6 cm x 62.2 cm x 55.9 cm)

Models conform to the following standards:

- UL Standard 61010-1 (60 Hz models).
- CAN/CSA C22.2 No. 61010.1 (60 Hz models).
- CE Conformity marking (230 volts, 50 Hz models).



FreeZone Plus 6 Liter Cascade Freeze Dry System 7934020,
FreeZone Stopping Tray Dryer 7948020, 6-Port Tray Dryer
Manifold 7726500 and miscellaneous glassware.



Options include:

- PTFE-coated collector coil and chamber for processes involving corrosive compounds.
- Purge valve with switch for isolating the vacuum pump from the freeze dry system.
- Built-in stainless steel mini vacuum drying chamber, 5.1" w x 13.0" d x 2.5" h (12.9 cm x 33.0 cm x 6.4 cm), that includes 50-watt heater with microprocessor control to +60° C (+140° F), 3/4" thick clear acrylic lid and neoprene gasket. (Chamber is not cooled. The only cooling is from the frozen sample.)
- Domestic or international electrical configuration.

All models require (not included):

- Vacuum pump with a displacement of at least 98 liters per minute, 0.002 mBar ultimate pressure and fitting suitable for 3/4" ID vacuum hose. See pages 57-59.
- Drying accessory. See pages 46-54.
- Freeze dry glassware if not bulk freeze drying. See pages 60-63.

See ordering information on page 39.

*Freeze drying rate will be lower for samples other than shell-frozen plain water. For optimum performance, room temperature should be 21° C (70° F) or colder.

❖ Exclusive feature